ON THE METEORITE FROM RICH MOUNTAIN, JACKSON COUNTY, NORTH CAROLINA.

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with chemical analyses by Wirt Tassin,
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The meteorite described below was received at the United States National Museum from Prof. H. H. Brimley, curator of the State Museum at Raleigh, North Carolina. To him I am also indebted for most of the information relative to its fall.

The exact date of fall can not be given, but it is stated as "about the 20th of June, 1903, and 2 o'clock in the day." Concerning the phenomena of the fall, the following is gleaned from a letter of Mr. E. A. Cook, of Rich Mountain, to Mr. Brimley:

"It [the meteorite] was going nearly due south; I did not see it, though it passed directly over my place. It made a rumbling sound something like a tornado of wind, or the pouring of water." The explosion Mr. Cook compares to a "large blast," the first and loudest being followed by lesser sounds, compared to the shooting of a self-acting pistol. Reports from the adjacent parts of South Carolina were to the effect that the passage of the stone was heard and seen there, and it created great excitement. It was also seen by people living 10 miles northwest of Rich Mountain, who reported it as looking like a ball of fire the size of a flour barrel. The single piece secured (See Plate XVI) passed through the top of a green tree, cutting off the leaves and small limbs, and struck the ground not more than 40 feet from a man standing in a field, who dug it up and gave it to Mr. Cook. Other fragments were reported to have been found across the State line in South Carolina. Such, however, have not come into the possession of the writer, nor has he been able to get track of them. The single piece which has thus far come to light is that shown in Plate XVI, which weighed 668 grams; actual size, 122 mm. in length; 76 mm. in breadth by 44 mm. in thickness. This is

obviously a freshly broken piece from a larger mass, the crust on the flat surface (lower side in fig. 1) being very thin, not nearly equal to that on the rounded surface. There is no fluting or grooving to indicate the orientation during flight, but the smoothness of the rounded point (upper left in fig. 1) suggests at least that this formed the nose or breast of the stone in its passage through the air. The proximity of this locality to that of the Hendersonville meteorite recently described by the writer [a] might at first suggest that it represented a part of the same fall. The testimony of eyewitnesses to the phenomenon and the freshness of the sample as compared with the last named, however, preclude any such conclusion. The close similarity of the stone to that of Bath Furnace, Kentucky, as described by Ward [b] is also worthy of note, although there is an interval of over six months between the dates of fall.

The black crust is dull, and somewhat rough. On the recently broken, flat surface, where the crust is thinnest, and on the rounded surface the metallic iron particles project, seemingly having resisted the frictional heat of the atmosphere more than did the silicate portions. This is shown plainly in fig. 2 of Plate XVI. A cut surface shows a gray, compact, indistinctly chondritic structure, with gray and more rarely white "kugels" and an about medium scattering of metallic iron and troilite. The texture is coarser, less compact, and in color a lighter gray than that of the Hendersonville stone, but closely like that of Bath Furnace. The stone is traversed by numerous fine, thread-like, black veins, often branched, and without common orientation. Although sought for with care, no certain indication of movement along these lines could be discovered. Indeed, the evidence was almost wholly to the contrary, the veins sometimes passing directly through the chondrules without evident relative displacement of the portions thus separated.

Under the microscope the structure is somewhat obscure, the chondrules being often fragmental and not strongly differentiated from the fine, pulverulent ground. Olivine and enstatite, the latter prevailing, with an occasional monoclinic pyroxene, are the principal silicate constituents, the first named in chondrules of the polysomatic and barred type, and in scattered granules; the enstatite in cryptocrystalline radiate forms, granules, and occasional relatively large, almost colorless and clear plates. Interspersed with these are minute colorless areas, showing no crystalline outlines, cleavage, or other evidences of crystal structure, little relief and polarizing only in light and dark colors. These areas are at times so abundant as to form the base in which the other constituents are embedded. They are evidently com-

[a] Proc. U. S. Nat. Mus., XXXI, 1907, pp. 79–82.

[b] Proc. Rochester Acad. of Sci., IV, 1905, p. 192.

posed of a single mineral, the optical properties of which are so ill-defined as to make a satisfactory determination impossible. At times it is quite isotropic, but more commonly it shows a faint double refraction, and in a very few instances the attempt at obtaining an interference figure resulted in a very indistinct dark brush, suggestive of a biaxial mineral. Between crossed nicols, if not always dark, it shows no definite extinction plane, but the dark wave sweeps over the surface much as in an isotropic mineral in a condition of strain. In a single instance one of these areas adjoined and partially inclosed a minute particle showing the parallel twin bands of a plagioclase feldspar. The mineral is regarded as unquestionably the same as that so common under similar conditions in the meteorite of Altianello, Italy, and which has been considered by V. Toullon[a] as maskelynite, a conclusion adopted by Tschermak.[b] The present writer also noted its occurrence in the recently described meteoric stone from Coon Butte, Arizona.[c] Compared with terrestrial rocks, it is of interest to note that similar structures and associations of pyroxene or olivine, and what are unquestionably feldspars, are found in peridotites of the wherlite type, as described[d] by the writer some years ago from the Red Bluff region of Montana.

In addition to the above is an occasional plate of a colorless silicate likewise of a doubtful nature. The plates are of irregular outline, faintly gray or almost completely colorless, and show very faint, short, sharp cleavage lines, and rarely any inclosures of other minerals which are so conspicuous a feature of the maskelynite. The surface viewed under a high power has a peculiar roughness, in which also it differs from the above. Between crossed nicols it gives weak polarization colors, and is optically biaxial, though good interference figures are not obtainable. The description given by Tschermak[e] of a mineral referred to as possibly monticellite would apply equally well to this, though the present writer confesses to a considerable feeling of doubt as to its true nature.

The structure and composition of the stone, as a whole, is comparable with those of Lancon, France, and Bath Furnace, Kentucky (Cia). It will be known as the Rich Mountain meteorite.

CHEMICAL ANALYSIS BY MR. WIRT TASSIN.

A very small portion of the meteorite, 5.8 grams in all, was available for analysis. This was treated in the usual way, the native metals (I), sulphur (II), phosphorus (III), soluble and insoluble silicates (IV

[a] Sitz. Wien. Akad., LXXXVIII, 1883, p. 433.

[b] Die Mikroskopische Beschaffenheit der Meteoriter, see especially pl. XVII, fig. 2.

[c] Am. Jour. Sci., XXI, May, 1906, p. 347.

[d] Proc. U. S. Nat. Mus., XVII, 1895, p. 651.

[e] Sitz. Wien. Akad., LXXXVIII, Pt. 1, 1883, p. 355.

and V), and the alkalies (VI), each being determined in separate portions. The values obtained are as follows:

I.	Fe	7.07
	Ni	.73
	Co	.031
II.	S	1.42
III.	P	.03
IV.	SiO_2	18.28
	FeO	9.06
	Al_2O_3	.50
	CaO	.99
	MgO	18.16
V.	SiO_2	23.00
	FeO	4.92
	Al_2O_3	2.10
	CaO	1.51
	MgO	8.27
	Fe_3O_4 (magnetite)	.15
	C (graphite)	.015
VI.	K_2O	.16
	Na_2O	.68

From these several values the approximate composition of the mass may be arrived at as given below:

Iron	7.070	Insoluble silicates	40.670
Nickel	.730	Magnetite	.150
Cobalt	.031	Graphite	.015
Troilite	3.890		
Schreibersite	.200		99.736
Olivine	46.990		

In the analyses above given the absence of copper in the native metals and chromite among the compounds is to be noted. Attention is also to be called to the presence of carbon as graphite, occurring as graphitic chondrules, which may or may not be contained in or surrounding particles of the native metals. The occurrence of the graphite is especially interesting, since the relatively large amounts of it do not appreciably affect the color of the groundmass.